

Wild Turkey



First Draft

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EXECUTIVE SUMMARY

Efforts to introduce wild turkeys into Washington have been made since the early 1900's. Since 1960, when the first wild-trapped turkeys were introduced into the state from Arizona, New Mexico, and Wyoming, turkeys have maintained naturally reproducing populations in much of the forested portion of eastern and southwestern Washington. Currently, three sub-species of wild turkey (Merriam's, Rio Grande, and eastern) can be found in Washington.

As the result of an aggressive introduction program that began in the mid-1980's, Washington's wild turkey populations have experienced substantial increases in density and distribution. Recreational interest in the wild turkey has increased along with the populations. The number of turkey hunters in Washington has increased from 689 in 1984 to over 15,000 in 2004. Wild turkeys are also popular with those who enjoy bird watching and photography.

Wild turkeys are adaptable to a broad range of habitats and weather conditions. In Washington, management efforts have focused on matching sub-species to the habitat types that most closely approximate that of their native range. Available food resources, nesting and roosting habitat, and precipitation regimen are some of the factors that have been considered through time.

Wild turkeys eat many different kinds of plants, seeds and fruits, and invertebrates (insects, spiders, snails), usually focusing their diets on the food items that are most available. In general, the diet of an adult turkey is made up of 75% plants and 25% insects while the diet of a young poult ranges from 75% to 90% insect matter. During the winter, turkeys in eastern Washington gather into large flocks, sometime of 100 or more birds, and are commonly found around a source of artificial feed like oat hay or other grain.

Throughout their range, wild turkeys are vulnerable to various diseases and parasites. This is complicated by the fact that they are susceptible to many of the same diseases that domestic chickens and turkeys carry. In efforts to keep these avian diseases from impacting both wild and domestic stock, the Washington Department of Fish and Wildlife (WDFW) tested all of the turkeys that were imported from other states prior to release. In addition, many of the turkeys that have been trapped within the state have also been tested. To date, there have been no positive results reported for any of the birds tested.

The number of turkey nuisance complaints has increased over the past 10 years, especially in parts of northeastern Washington where the populations have expanded the most. Response to these complaints has ranged from telephone conversations with landowners to trapping offending birds. In very few situations, lethal removal of a specific number of birds has been authorized.

The first official turkey hunting season was conducted in the fall of 1965 (one and a half days in northeastern Washington). The length of the season increased over time and in

1970, the first male only spring hunting season was conducted. In the late 1980's, the spring season was three weeks long and a one-week fall either sex season was also held. The current 30 day spring season was established in 1994, which is also when the bag limit was increased to three. In addition, a special youth hunt was established in 2003 which contributed to the more than 63,000 days hunters spent afield hunting turkeys that year.

Currently, WDFW relies on turkey hunter harvest reports to provide an index to turkey population status. In an effort to provide a harvest-independent measure of population growth, WDFW is proposing to enlist the help of volunteers to implement a wintertime road transect count. Considering the difficulty of obtaining adequate turkey counts in the dense forest habitat, low turkey density, and the fact that the eastern sub-species does not typically gather in large flocks, WDFW is not recommending a harvest-independent survey in western Washington.

Establishing self-sustaining populations of wild turkeys in the most suitable habitats continues to be a primary objective of the wild turkey management program. Since a vast majority of the most suitable habitats currently support turkeys, very few areas are designated as potential introduction areas. Also, additional releases in areas where significant introduction plans were recently implemented are not targeted to receive additional birds.

Damage and nuisance issues will continue to arise, however, trapping will not be a primary mitigation response. A nuisance response "toolbox" that focuses on alternative actions has been developed. When alternative methods fail to address the nuisance problem, trapping is still an option. Turkeys trapped in response to nuisance and damage complaints will be released within the Wild Turkey Management Area in or adjacent to currently occupied areas.

Before turkeys can be released in the Potential Introduction Area, the proposal must be evaluated by local, regional and program staff. The evaluation will include, at a minimum, examination of current and potential nuisance and damage issues, impacts to existing management actions, and impacts to the long-term survival of state and federally listed species (e.g., endangered and threatened) as well as candidate and sensitive species. Measures to mitigate potential negative impacts, if they exist, will be identified. If impacts cannot be mitigated or no mitigation measures can be found, turkeys will not be released on that site.

Additional biological and management information is needed to help manage turkeys in the state of Washington. Specifically, WDFW is interested in conducting or helping conduct investigations to address the issues of inter-specific competition and wild turkey nutrition, habitat utilization, and limiting factors analysis in western Washington.

Conducting habitat improvements for the wild turkey is going to receive greater emphasis in the future of the wild turkey management program. Habitat improvements can be done in cooperation with other state or federal agencies as well as non-governmental organizations (e.g., the National Wild Turkey Federation). In many cases,

habitat improvements made for the wild turkey will also improve habitat conditions for other species in the area. Habitat projects that provide these multiple values will be a priority.

Providing quality hunting opportunities will continue to be a priority for the turkey management program. Information gathered from surveys of hunters has identified hunter access to private property as one of the most important issues to Washington hunters. As a piece of an overall hunter access program, efforts will be made to improve access for turkey hunters in much of the state. In addition, WDFW will continue to collect the best harvest information available through the current mandatory reporting system. This information is critical to providing the appropriate level of recreational opportunity.

No program is complete without a concerted effort to educate and inform the public. Information about the wild turkey program in general as well as specific information about avoiding negative interactions, turkey management activities, and a variety of recreational opportunities needs to be developed and provided to the public. There may be opportunities to partner with various organizations and agencies to develop and distribute many of these materials.

SECTION ONE: NATURAL HISTORY

Physical Characteristics

Wild turkeys (*Meleagris gallopavo*) belong to the gallinaceous bird family Phasianidae along with other fowl-like birds. They have typical game-bird features including strong, scaly feet, short, rounded wings, and a short, strong beak. There are observable physical differences between males and females, especially when looking at the head. Males (gobblers) can have various shades of red, white and blue on their heads, but females (hens) have darker, duller colored heads. Both sexes have very few feathers on their head and upper neck (Pelham and Dickson 1992).

Adult male plumage is dark and striking with its metallic iridescence in shades of red, green, copper, bronze and gold. Breast and upper back feathers are black tipped giving it a darker appearance. The female's plumage is understandably duller, appearing brown or lighter, due to the buff or chestnut colored tips on breast and upper back feathers. Subspecies can usually be distinguished based on feather color of lower back and tail margins. Eastern turkeys have chestnut tail feather tips, Rio Grande's have cinnamon or pinkish buff tips, and Merriam's have lighter, ashy-white tipped feathers.

Gobblers continuously grow a tuft of hair-like fibers (beard) from the upper chest, averaging 9 to 11 inches long. Hens can also grow a beard, but only about one-third of them sprout any 'hair' (Lewis 1967, Williams and Austin 1988). Hen beards are shorter and thinner, usually less than 7 inches long (Pelham and Dickson 1992). Gobblers typically develop a sharp, curving bony growth, or spur, on the lower leg that can sometimes grow longer than two inches.

Adult males usually weigh between 17 and 21 pounds, but can exceed 25 pounds, depending on the subspecies. Females normally weigh between 8 and 11 pounds. Gobblers, at attention, can stand 40 inches tall; hens stand about 30 inches tall (Mosby and Handley 1943). Both sexes are swift runners at more than 12 miles/hour (Mosby and Handley 1943) and adults have been reported flying at speeds up to 55 miles/hour. They prefer running to flying to escape danger even though they're one of the fastest flying game birds.

The turkey's laser-sharp vision, although not three-dimensional, is legendary. It can swiftly assimilate visual details and with eyes located on each side of its head, slight movements allow a turkey to quickly scan 360 degrees (Pelham and Dickson 1992). Turkeys also have keen hearing, but like most birds, a poorer sense of taste and smell.

Geographic Distribution

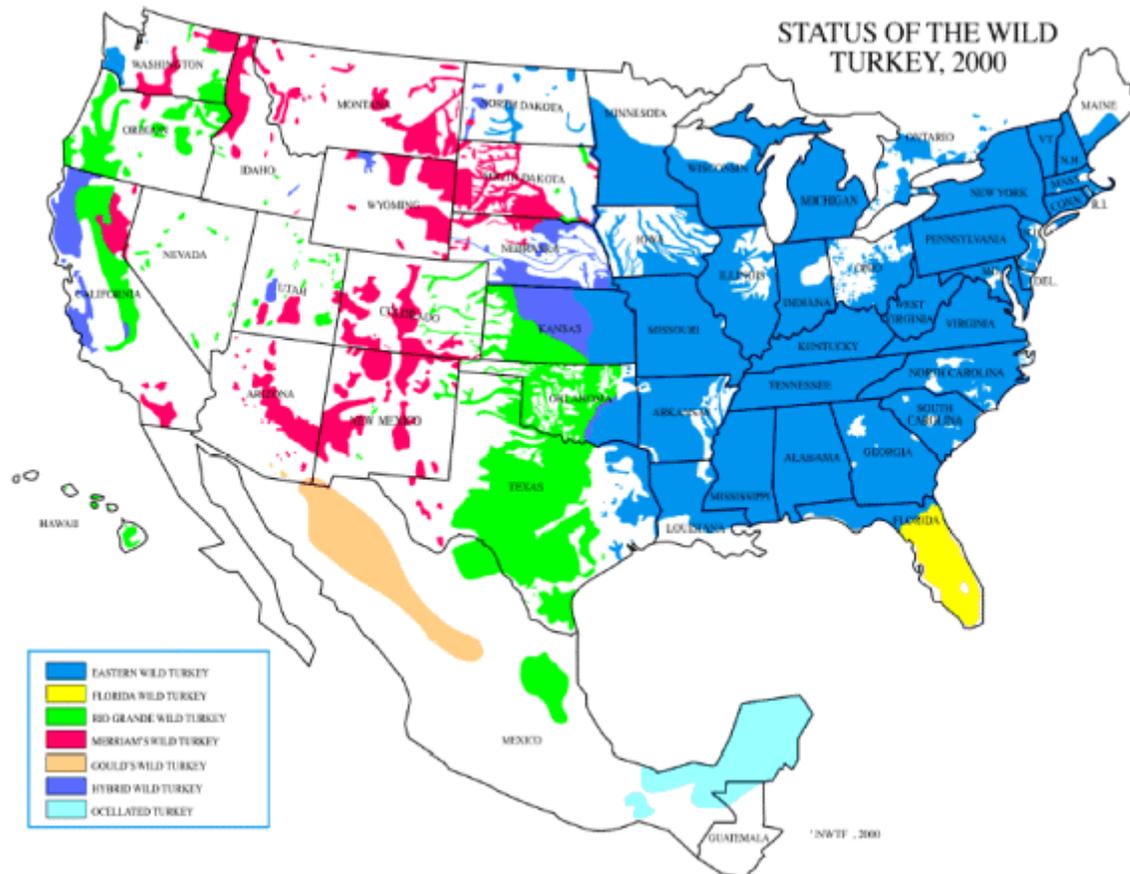
There are five subspecies of wild turkey in North America. They are the eastern wild turkey (*M. g. silvestris*), native to the eastern half of the United States; the Merriam's (*M.g. merriami*), native to the mountainous regions of the south-central U.S; the Rio Grande turkey (*M.g. intermedia*), native to the south-central Great Plains states and northeast Mexico; the Florida wild turkey (*M.g. osceola*), native to the southern half of

Florida; and the Gould's (*M.g. mexicana*) turkey, native to northwest Mexico and parts of southern Arizona and new Mexico (Kenamer et al. 1992).

Wild turkeys were abundant and widely distributed throughout much of North America when settlers first arrived. Native Americans and early settlers depended on turkeys as a reliable and important source of food. However, by the early 1900s, wild turkey populations were wiped out or reduced to dangerously low levels, except in the more inaccessible portions of their original range. It is theorized that there were two major factors responsible for nearly extinguishing wild turkeys—excessive hunting by early settlers for table and profit, and logging and clearing forests for agriculture (Kenamer et al. 1992).

Recovery of wild turkey populations from near extinction to present levels is a success of modern wildlife management. Kenamer and Kenamer (1990) estimated wild turkey populations to be 3.5 million birds in 1992 in the United States, Canada and Mexico. Wild turkeys are now found in every state but Alaska (Figure 1) (Tapley, Abernethy, and Kenamer (2000).

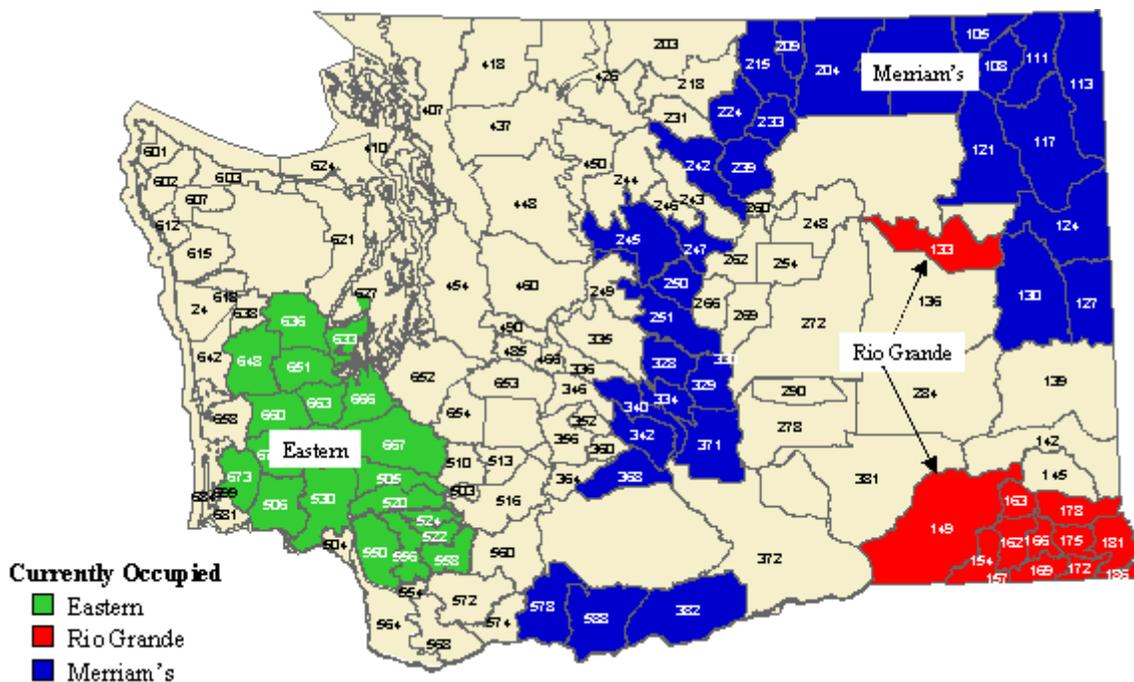
Figure 1. Distribution map for the 7 sub-species of wild turkeys in the United States and Mexico in 2000.



Although several attempts at introducing captive bread turkeys into Washington were unsuccessful in the early 1900's, three of the five subspecies of North American wild turkey have been introduced into Washington. Merriam's turkeys were the first to arrive in 1960, from Arizona, New Mexico and Wyoming. They were released into the oak (*Quercus spp.*) and pine (*Pinus spp.*) forests of south central and NE Washington (Ferry, Klickitat, Lincoln, Okanogan and Stevens counties). Rio Grande turkeys from Texas were next, released in 1984 into the transition zone between arid rangelands and forests in of eastern Washington (Asotin, Chelan, Columbia, Garfield, Lincoln, Walla Walla, Whitman, Kittitas, Chelan, and Yakima counties). In 1987 eastern wild turkeys from Pennsylvania arrived and were placed in similar forest areas in western Washington (Cowlitz, Grays Harbor, Lewis, Pacific and Thurston counties).

Since the original introductions, Merriam's turkeys have been introduced in areas along the eastern front of the Cascade Mountains. Figure 2 shows the wild turkey distribution in Washington based on existing Game Management Unit (GMU) boundaries. However, not all portions of identified GMUs currently support turkeys.

Figure 2. Distribution of Washington's three sub-species of wild turkeys in 2004 using existing Game Management Unit boundaries.



General Habitat Requirements

Wild turkeys are adaptable to a broad range of habitats and weather conditions, as their ability to currently live in more than three-quarters of the United States (and many other countries) attests. Optimum wild turkey habitat generally includes a diverse landscape that contains a wide variety of trees, shrubs, perennials, forbs, ground covers and grasses at different stages of growth (Dickson et al. 1978). This diversity provides turkeys with the different types of nesting, rearing, resting, roosting and hiding places

they need as they grow from egg to adult, and includes a variety of food sources that likely ensures there'll be something to eat when overall natural food production is poor (Dickson et al. 1978).

From two decades of intense research we now know that (1) too much water (marshes, deep persistent snow) or too little (intermittent streams and ponds, arid land that can't grow trees) ultimately determines the turkey's distribution, and (2) suitable habitat must contain, in addition to enough precipitation, appropriate trees and grasses. Trees provide nuts and fruits, daytime rest and escape areas and most importantly, nighttime roosts. Grasses and forbs provide food for adults and homes for insects, which are very important for newly hatched turkeys (Mackey 1982, Porter 1992).

Having all these elements within a turkey's home range is what creates ideal habitat (Brown 1980). The thinking 60 years ago was that turkeys needed the vast majority of their home range in trees, but research in Missouri, Iowa and Minnesota suggest that the optimum mix is closer to 50 percent forested to 50 percent open land (Little 1980). Extensive areas of cleared land are not suitable as turkey habitat (Porter 1992).

Nesting Habitat

Even though hens nest in such divergent locales as forests, hayfields and power right-of-ways, researchers in the 1980s found that in each case, well-developed grasses, ground covers and shrubs to 3 feet high typically surround the nest (Porter 1992b). This kind of undergrowth conceals the nest from ground-based predators, but allows the hen a commanding view above the vegetation to identify potential threats (Holbrook, Vaughan, and Bromley 1987). Other potential nest site characteristics are an overhead forest canopy of 50 to 90 percent (Goerndt 1983) and a preference for sites with moderate soil moisture (Goerndt 1983, Lazarus and Porter 1985). Nests themselves are often found at the base of trees or dense shrubs, or against fallen logs, rock outcroppings or hillsides so as to be completely hidden from one side (Healy 1992, Porter 1992).

Rearing Habitat

Overall, open grassy areas with scattered trees provide the best environment for raising turkey broods (Hayden 1979, Metzler and Speake 1985). Studies from 11 states all describe brood habitat as completely covered with forbs and grasses averaging 20 inches high, with a 10 to 50 percent overhead cover (Porter 1992). The grasses and other non-woody vegetation provide seeds and greens for hens and abundant insects and spiders for protein-hungry poults (young turkeys) (Hurst and Poe 1985).

At the same time, this type of vegetation offers excellent protection from predators. Hens can easily see over grasses and herbs between 12 and 28 inches high to scan for predators, while poults remain hidden and can move freely (Porter 1980, Exum 1985, Songer 1987). At 12 to 15 days old, poults can fly and are too big to gather under the hen, so nearby trees provide shelter from heat and inclement weather, as well as a safe place to escape predators (Porter 1992).

Fall and Winter Habitat

During this time of year, the wild turkey's priorities are food and roosting areas. In the fall, food remains critical for yearling growth and adults adding fat reserves, so forests that offer seeds, nuts and fruits as well as some green vegetation are sought out (Kenamer, Gwaltney, and Sims 1980). In some areas where snow more than 6 inches deep covers the ground for two to 16 weeks, spring seeps that don't freeze over become life-saving mini-habitats. They provide invertebrates and green vegetation for turkeys throughout the winter (Goerndt, Schemnitz, and Zeedyk 1985). Where agriculture predominates, a mix of cropland and forest appears highly suitable, particularly if corn is available (Clark 1985, Kulowiec and Haufler 1985).

Turkeys don't seem picky about summer roosting spots, using almost any horizontal spreading structure 30 to 100 feet high near where they've been foraging (Porter 1992, Shaw and Mollohan 1992). However, this is not true of winter roosts. Merriam's and Rio Grande turkeys especially tend to gather in large flocks and use traditional roosts nightly (Hoffman 1968). Mackey (1984) and Lutz and Crawford (1987) found that turkeys preferred the largest trees in the grove and roosted as high up as they could comfortably perch. When the temperature often dips below freezing, turkeys congregate where protected from prevailing winds, typically on the upper half of northeast facing slopes (Hoffman 1968, Boeker and Scott 1969, Goerndt 1983).

Subspecies Habitat Requirements

Eastern Turkey

Along the east coast of the United States, this dark colored subspecies resides in fairly moderate climates with warm, humid summers and moderate-to-cold winters. Rainfall amounts are about equal each month, and average 45 inches a year, similar to southwestern Washington's 50 inches annually (Wunz and Pack 1992).

The eastern turkey's native habitat is primarily oak-hickory and hardwood forests containing sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), American beech (*Fagus grandifolia*), yellow birch (*Betula alleghaniensis*), black cherry (*Prunus serotina*), eastern hemlock (*Tsuga canadensis*), white pine (*Pinus monticola*) and white oak (*Quercus alba*) (Wunz and Pack 1992). The mixed evergreen and deciduous forests of western Washington are comparable, consisting of Douglas fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), red alder (*Alnus rubra*) and bigleaf maple (*Acer macrophyllum*) (Washington Department of Fish and Wildlife, unpublished report).

Easterns will nest in almost any habitat type - uncut hay fields, weed fields, dense shrub cover and open-understory forests (Hayden 1980). However, hens in the eastern states prefer and are more successful in extensive (rather than isolated) stands of brush and herbaceous vegetation, mostly along its edges (Wunz and Pack 1992), while hens in the Midwest prefer timber and semi-open woodlands, with a diverse moderate-to-dense understory (Kurzejeski and Lewis 1990). Western Washington's forests contain interspersed clearcuts and slash areas, which can provide the ground-level visual

obstruction and semi-open feeding areas needed for nesting and raising broods (Washington Department of Fish and Wildlife, unpublished report).

In native areas Easterns use pastures, hayfields, clearings, log landings, forest access roads and if suitable, even forests, to raise their young in (Ross and Wunz 1990, Wunz and Pack 1992); similar habitats are available in Washington. During fall and winter months, easterns tend to stay in the forest but will range into crop fields and clearings to eat grains and seeds (Wunz and Pack 92). In fact, a mix of cropland and forest cover seems to be highly suitable habitat (Porter 1992), and in both the northern and southern U.S., optimal fall/winter conditions may be a one-to-one ratio of forest cover to agricultural land (Little 1980).

Merriam's Turkey

The native area of this light colored subspecies is the coniferous mountains and canyons of Colorado, New Mexico and Arizona, much of it relatively steep. These birds can handle extreme temperatures from – 35 degrees F to 100 degrees F (Shaw and Mollohan 1992). Precipitation in their native range averages more than 15 inches a year and is mainly heavy winter snowfall and summer thunderstorms. Northeastern Washington and areas in central Washington have a climate and topography that closely resemble this turkey's native conditions, including extreme temperature fluctuations, heavy snows and storms, and an average annual precipitation of 24 inches (Mackey 1982).

Native habitat for Merriam's turkey is primarily mixed conifer communities, consisting of ponderosa pine (*Pinus ponderosa*), Gambel oak (*Quercus gambellii*), pinon pine (*Pinus edulis*), Douglas fir (*Pseudotsuga menziesii*), white fir (*Abies concolor*), western white pine (*Pinus monticola*), limber pine (*Pinus flexis*), junipers (*Juniperus spp.*), spruces (*Picea spp.*), cottonwoods and aspens (*Populus spp.*) (Shaw and Mollohan 1992, Hoffman et al. 1993) Likewise, Eastern Washington's forests contain ponderosa pine (*Pinus ponderosa*), Douglas fir (*Pseudotsuga menziesii*), western white pine (*Pinus monticola*), Engelmann spruce (*Picea engelmannii*), plus other pines (*Pinus spp.*), firs (*Abies*), Douglas maple (*Acer glabrum*), willows (*Salix spp.*), cottonwoods and aspens (*Populus spp.*).

Merriam's turkeys in New Mexico prefer to nest in mixed stands of Ponderosa pine (*Pinus ponderosa*), spruce (*Picea spp.*), white fir (*Abies concolor*), Douglas Fir (*Pseudostuga menziesii*), aspen (*Populus tremuloides*) and white oak (*Quercus alba*), Kamees 2002). The nest is often on a slope greater than 30 percent (Shaw and Mollohan 1992). In Washington, Merriam's nest among Ponderosa pine (*Pinus ponderosa*), white oak (*Quercus alba*) (Mackey 1982) as well as in mixed conifer stands with dense shrubs adjacent to deciduous riparian zones (Lutz and Crawford 1987).

The Merriam's commonly travels 5 to 20 miles between suitable summer and winter ranges, but have been known to move 40 miles or more (Kamees 2002). Winter habitat consists of moderately dense stands of evergreen trees and must not be isolated from

adjoining feeding and loafing habitat (Scott and Beoker 1975). In Washington, Mackey (1984) found turkeys preferred to roost in Douglas fir and white fir (*Abies concolor*), perhaps due to better thermal cover and perching branches.

Rio Grande Turkey

Originating from the Great Plains of Kansas, Oklahoma and Texas, this subspecies is also very adaptable to landform and climate changes. Topography varies from grasslands and prairies to shrubby and wooded rangelands to deep canyons and draws. Rainfall is between 15 and 35 inches while temperatures vary from – 32 to 120 degrees F (Beasom and Wilson 1992). They were released in portions of northeastern and southeastern Washington that are most similar to their native habitat of plains, grasslands, oak-hickory forests and low shrubs (Washington Department of Fish and Wildlife, unpublished report).

On the Great Plains, woody plants, such as cottonwoods (*Populus spp.*), willows (*Salix spp.*), elms (*Ulmus spp.*), sycamores (*Platanus spp.*), hackberries (*Celtis spp.*), pecans (*Pecan spp.*), junipers (*Juniperus spp.*) and mesquites (*Prosopis spp.*), are crucial to this bird—30 species of trees and shrubs provide mast, 21 tree species are used for roosting, and others are used for nesting, loafing and escape cover (Beasom and Wilson 1992). Some of these species also exist in the areas where Rio Grands were released in Washington.

Unlike the two previous subspecies, Rio Grands do appear to select nest sites that are relatively close to permanent water—within 0.4 kilometers (0.25 miles) (Beasom and Wilson 1992). Their nests are typically in dense grasslands near streamside areas and are well concealed in grasses and brush (Kamees 2002). Typically, openings and mowed pastures are used for mating; mixed grass-shrub areas for brood rearing and summer feeding, although woody escape cover is always nearby (DeArment 1959). During the fall, wooded habitats are used more frequently, and winter roost sites are usually wooded streamside areas or in deep valleys near water (Beasom and Wilson 1992). In southeast Washington, the forest/rangeland transition areas interspersed with wheat fields and riparian drainages appear to provide ideal fall/winter habitat (Washington Department of Fish and Wildlife, unpublished report).

Food and Eating Habits

Wild turkeys eat many different kinds of seeds and fruits, invertebrates (insects, spiders, snails), plants (including roots, stems and flowers) and even the occasional small lizard or frog. Their year-round diet closely resembles what plants and animals are most abundant in each season (Hurst 1992). No matter the subspecies, wild turkeys all eat the same general food types—greenery of grasses, sedges and forbs; seeds of grasses and forbs; agricultural crops; hard and soft nuts (mast); and animal matter (Hurst 1992). In spring and summer, turkeys eat mainly herbaceous vegetation—grasses and forbs plus fruits, insects, and other invertebrates. In the fall and winter, the primary food is nuts, supplemented with seeds, berries, green vegetation and invertebrates.

A study of turkey droppings in Missouri found that seeds, leaves, fruits and hard nuts made up about 75 percent of the adult annual diet, and the remaining 25 percent consisted of insects (Dalke et al. 1942). For poults, insects generally make up 75 to 90 percent of their diet the first week after hatching; this declines each week as poults grow in strength and skill, and more vegetation becomes available (Hurst 1992). Succulent plant matter, particularly grasses, is considered essential in providing vitamins to hens during the breeding season (Hurst 1992), while invertebrates provide breeding hens with much higher protein, calcium and phosphorus than plants do (Beasom and Wilson 1992).

Turkeys seem to have two feeding times—one soon after leaving the night roost and another around mid-afternoon (Mosby and Handley 1943). However, they may spend most of the day eating, depending on time of year, what's available, and the weather (Mosby and Handley 1943). Turkeys are strong scratchers that can dig through deep litter and soil to quickly spot tiny morsels with their keen vision (Hurst 1992).

Eastern Subspecies

Preferred foods in eastern turkey's native habitat include acorns; beechnuts; dogwood fruit; seeds and leaves of grasses and sedges; corn; fruit and seeds of grapes, cherries, sumac and poison ivy, and the fruits and leaves of forbs and vines (Mosby and Handley 1943). When other food sources fail, easterns will eat ferns, mosses, lichens and even hemlock (*Tsuga spp.*) needles (Bailey and Rinell 1967). In Washington, eastern turkeys eat the soft mast of Pacific dogwood (*Cornus nuttallii*), hawthorn (*Crataegus spp.*), Oregon grapes (*Mahonia spp.*), huckleberries (*Vaccinium spp.*), blackberries (*Rubus spp.*), cherries (*Prunus spp.*), sweetgum (*Liquidambar styraciflua*) and crab apple (*Malus fusca*) (Washington Department of Fish and Wildlife, unpublished report). However, western Washington forests lack the hard mast produced in eastern U.S. forests.

Merriam's Subspecies

Preferred foods in Merriam's turkey's native habitat include Ponderosa pine (*Pinus ponderosa*) seeds, acorns, pinon nuts, grass seed heads, juniper (*Juniperus spp.*) berries, kinnikinnick (*Arctostaphylos uva-ursi*) berries, currants (*Ribes spp.*), wild oats (*Avena spp.*), clover (*Trifolium spp.*), watercress (*Nasturtium spp.*) and of course grasses, although feedlot grains are also eaten (Hurst 1992, Shaw and Mollohan 1992, Kamees 2002). In Washington, Merriam's eat grass leaves and seeds, acorns, pine seed, grasshoppers, and forbs and other fruits such as wild strawberry (*Fragaria spp.*) (Mackey and Jonas 1982, Washington Department of Fish and Wildlife, unpublished report).

Rio Grande Subspecies

Preferred foods in the Rio Grande's native habitat include pecans, acorns, prickly pear (*Opuntia spp.*) fruit and seeds, hackberry (*Celtis spp.*), cedar elm (*Ulmus crassifolia*), grass and forb seeds, insects, snails, and grain (corn and sorghum) (Hurst 1992). In Washington, Rio Grands likely eat grass and sedge seed heads, hackberry (*Celtis*

spp.), cedar elm (*Ulmus crassifolia*), prickly pear (*Opuntia spp.*) ashe juniper (*Juniperus ashei*), the fruits and seeds of various shrubs, and the foliage of forbs and grasses (Washington Department of Fish and Wildlife, unpublished report).

Population Dynamics

Reproduction

Increasing daylight between late winter and early spring triggers the beginning of breeding season, although unusually cold or warm weather may delay or advance it (Healy 1992). Gobbling and strutting start well before mating, anywhere from February (Texas, New Mexico) to April (Vermont and other northern range states) while turkeys are still on their winter range, and run through May (Healy 1992.). There are normally two peaks of gobbling—the first when males are calling females, and the second, a few weeks later, when most hens are incubating eggs (Bailey and Rinell 1967).

Turkeys have well-developed male and female pecking orders within and between their separate male and female flocks, so the dominant male of each brood breeds with as many females in a nesting area as possible (Healy 1992). Gobblers take no part in nesting or raising the young.

Hens disperse to find nesting areas, some of them returning to the previous year’s site (Healy 1992). Juvenile hens often wander two to three times as far as adult hens and frequently nest outside their previously established home range (Ellis and Lewis 1967, Exum et al. 1985). As discussed earlier, nests can occur in just about any habitat as long as there is immediate low cover dense enough to camouflage it. Nests are basically shallow depressions scratched in the ground. Generally, females will lay about one egg a day, ending with a clutch of nine to 12 eggs in about two weeks. Eggs are light buff to pale brown or purple in color with brown spots varying in size. Incubation takes 25 to 29 days, during which time the female leaves for only an hour or two at a time to eat (Healy and Nenko 1985).

Anywhere from 75 to 100 percent of hens attempt to nest at least once; for juvenile hens the percentage is somewhat lower (Table 1). Many hens will re-nest if their initial nest is destroyed, but to a lesser degree (32 to 63 percent). The proportion of hens hatching one or more poults (hatchlings to 4 week old birds) in at least one nesting attempt varies widely—25 to 82 percent for adults and zero to 61 percent for juveniles, depending on subspecies (Table 1). The percent of eggs that hatch in a successful nest is typically greater than 80 percent.

Table 1. Wild turkey nesting success rates from various studies in the United States (Vangilder 1992).

Subspecies	Nesting Rate		Hen Success		Eggs Hatched per Nest
	Adult	Juvenile	Adult	Juvenile	
Eastern	88-100%	42-100%	38-82%	15-61%	80-92%
Merriam’s	75-100%	8-31%	43-75%	0-25%	87%
Rio Grande	No data	No data	25-29%	0-13%	89-90%

At hatching, the average poult weighs about 1.6 ounces and will gain about 1 pound every month for the next three months (Healy 1992). Poults are covered with a yellowish down, and within 24 hours can run, feed on their own and keep up with the hen. Typically, they can fly on about the eighth day, and by the third week they are roosting in trees at night (Healy 1992). Most of their time is spent feeding, and the young eat an enormous amount of food. Broods typically stay with the hen four to five months, but female poults may stay until next year's breeding season (Healy 1992).

The life expectancy for wild turkeys has been documented at nine or more years (Mosby and Handley 1943), although the average is four years for Merriam's (Hoffman et al. 1993) and at least six years for easterns (Porter 1992). Under favorable conditions, when at least 40 percent of the young survive to breeding age, the population can easily more than double in a year (Porter 1992).

Mortality

The annual mortality rate of wild turkeys can fluctuate dramatically from 25 to 85 percent, although lengthy studies in some areas of the U.S. showed an average mortality range of 36 to 61 percent (five-year study in Minnesota) and 42 to 67 percent (nine-year study in Iowa) (Vangilder 1992). Mortality rates vary between years, seasons, males and females, and juveniles and adults. Hen mortality, which is greater than gobbler mortality, is highest when they are nesting. Poults are most vulnerable the first two weeks after hatching, when their mortality rate can be 60 percent or higher (Williams and Austin 1988).

The major causes of mortality include predation, harvest (legal and illegal), accidents, disease, parasites, and the weather. While poults may die if exposed to inclement weather, adult turkeys can adapt to widely varying climate and temperature conditions (Vangilder 1992). However, lengthy exposure to deep, persistent snow and extremely cold temperatures does kill some adult turkeys (Healy 1992).

Predation

Predation can be a significant factor at any age, as more than 20 species prey on turkeys, their poults or their eggs across the U.S. (Table 2). Predation was responsible for most wild turkey deaths (29 to 100 percent) in nine studies from six states (Vangilder 1992). Predators in Washington include mountain lions (*Felis concolor*), bobcat (*F. rufus*), black bear, coyotes (*Canis latrans*), red foxes (*Vulpes vulpes*), opossums (*Dilelphus virginiana*), raccoons (*Procyon lotor*) and skunks (*Mephitis mephitis*) (Washington Department of Fish and Wildlife, unpublished report).

Table 2. Major and minor wild turkey predators in the U.S. (Miller and Leopold 1992).

Mammals		Birds		Reptiles
<i>Major</i>	<i>Minor</i>	<i>Major</i>	<i>Minor</i>	<i>Major</i>
Bobcat	Armadillo	Broad-winged hawk	Bald eagle	Pine/bull snake
Lynx	Black bear	Crow	Eastern screech owl	King snake
Coyote	Badger	Goshawk	Short eared owl	Rat snake
Cougar	Groundhog	Great horned owl	Magpie	Eastern coachwhip
Dog	Wild or feral hog	Golden eagle		
Red/gray fox	Feral house cat	Red-tailed hawk		
Opossum	Ringtail	Raven		
Raccoon	Rock squirrel			
Skunk				
Fisher				

Harvest

Legal hunting and poaching can also be substantial sources of mortality. Studies in the Midwest showed that illegal hen kill was higher during years when spring gobbler season began before the peak of incubation (Kimmel and Kurzejeski 1985). However, if spring hunts are managed properly, they do not have a long-term impact on population numbers (Vangilder 1992). Fall hunts, however, can have a significant influence, and are the most useful for managing population numbers. Populations are likely to decline if more than ten percent of adult hens are removed in the fall hunt, especially if they were successful nesters (Healy and Powell 1999).

Diseases

Turkeys are subject to a number of viral and bacterial infections common to most fowl—domestic and wild. One of the most prevalent viral diseases is avian pox (genus *Avipoxvirus*)—a contagious infection common in much of the eastern turkey’s range and perhaps other subspecies as well (Davidson and Wentworth 1992). Transmission is by direct contact or mosquito bites and the external, prominent lesions can impair eating, respiration or vision. A common bacterial disease is mycoplasmosis (genus *Mycoplasma*), of which *Mycoplasmosis gallisepticum* causes severe respiratory distress, swollen sinuses and reproductive problems in wild turkeys (Davidson and Wentworth 1992).

Wild turkeys are also subject to infestations by a number of internal and external parasites including flatworms (flukes), tapeworms, roundworms, thorny-headed worms (acanthocephalan), and protozoan blood parasites (*Haemoproteus*, *Leucocytozoon*, *Plasmodium*) transmitted by blood-feeding insects and spiders. Most parasites are only a nuisance, although particularly heavy infestations may cause physical impairment or secondary infections (e.g. Histomoniasis, or blackhead disease) (Davidson and Wentworth 1992).

A documented case of a wild turkey that contracted Histomoniasis from domestic chickens occurred in 1985. A farmer near Colville, Washington was feeding wild turkeys in his chicken yard when he discovered a dead hen turkey. Washington

Department of Fish and Wildlife biologists, who examined the carcass, determined that this otherwise healthy bird died from Histomoniasis, carried by the chickens (Washington Department of Fish and Wildlife, unpublished report).

Disease is a major concern with any species introduction. To help address this concern, birds transplanted into Washington from other states were examined and tested by a veterinarian prior to introduction. To date, there have been no significant diseases detected in turkeys trapped within the state.

SECTION 2: POPULATION AND HABITAT STATUS

Population Management

Early Transplant Efforts

The first known attempt to establish wild turkeys in Washington occurred in 1913, 20 years prior to the establishment of the Washington Department of Game. During this time, fish and wildlife management fell under the jurisdiction of each county. These turkeys are thought to be the eastern subspecies raised on game farms (Washington Department of Fish and Wildlife 1996).

The Department of Game, established in 1933, continued to release pen-raised birds sporadically in various counties throughout the 1950s, but these releases did not result in established populations. This is not surprising, given that pen-raised turkeys do not learn where to find food, what predators are and how to respond to them, or how to live in a flock—all essential skills that ensure their survival in the wild (Leopold 1944).

The use of cannon nets in the 1950s finally made capturing wary wild turkeys feasible and efficient. In 1960, 36 wild-trapped Merriam's turkeys from Arizona and New Mexico were released at four sites in the eastern half of the state. Only the 12 Merriam's released in the ponderosa pine forests of south-central Washington (Klickitat County) succeeded. This created the oldest turkey population in Washington, and until 1990, the largest. Sixty Merriam's turkeys from Wyoming were released into similar habitat in northeast Washington (Stevens County) in 1961, again establishing a population. This was the beginning of the state's largest current population. However, many other releases of Merriam's turkeys into other areas of Washington during the 1960s and 1970s apparently did not take hold. By the late 1970s, these populations had declined and either remained at low levels or disappeared altogether.

Population Augmentation and Expansion

From 1984 through 2003, major transplant projects were undertaken in the eastern half and the southwest parts of the state. In 1988 and 1989, almost 500 wild-trapped Merriam's turkeys were transplanted into previously stocked and new areas in eastern Washington. Additional Merriam's were released in eastern Washington from 1990 through 2003. Northeastern Washington was the source for many of these releases as the Department used trapping and transplanting to help landowners deal with increasing turkey populations.

Since the mid-1980s, more than 500 Rio Grande turkeys from Texas (and later from thriving in-state populations) have been transplanted to 50 sites in eastern Washington's more arid canyons and streamside areas. During the same time period, over 400 eastern turkeys were transplanted from Iowa, Pennsylvania, and Missouri into southwestern Washington's mixed forest habitats.

Overall, approximately 2,400 wild turkeys have been released in Washington through 2003. The eastern, Merriam's and Rio Grande wild turkeys now occupy much of the forested habitat in the state. To more effectively manage these three subspecies, the state was divided into seven Population Management Units (PMUs), with names that match that portion of the state (Figure 3).

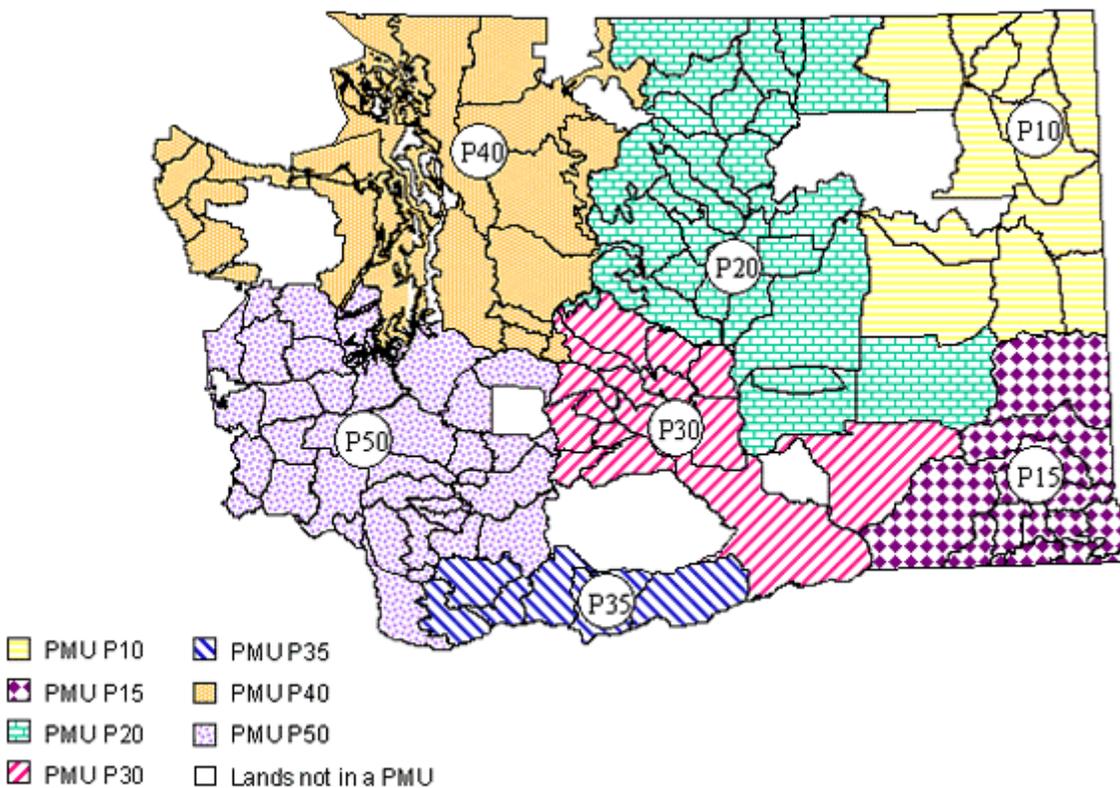


Figure 3. Wild turkey Population Management Units.

Nuisance and Damage Problems

Wild turkey populations have, over time, expanded into populated rural and suburban areas, seeming to adapt easily to humans and their more urbanized settings. Beginning in 1996, large flocks of turkeys that were a nuisance or became destructive were looked at as a source stock to initiate new flocks and supplement existing ones. Excess birds were trapped and moved to areas within the same county that had no turkeys, to other

eastside population management units, or were traded to other western states. The number of turkeys, mainly Merriam's, trapped and relocated per year has varied from 119 (in 1996) to 745 (in 2000).

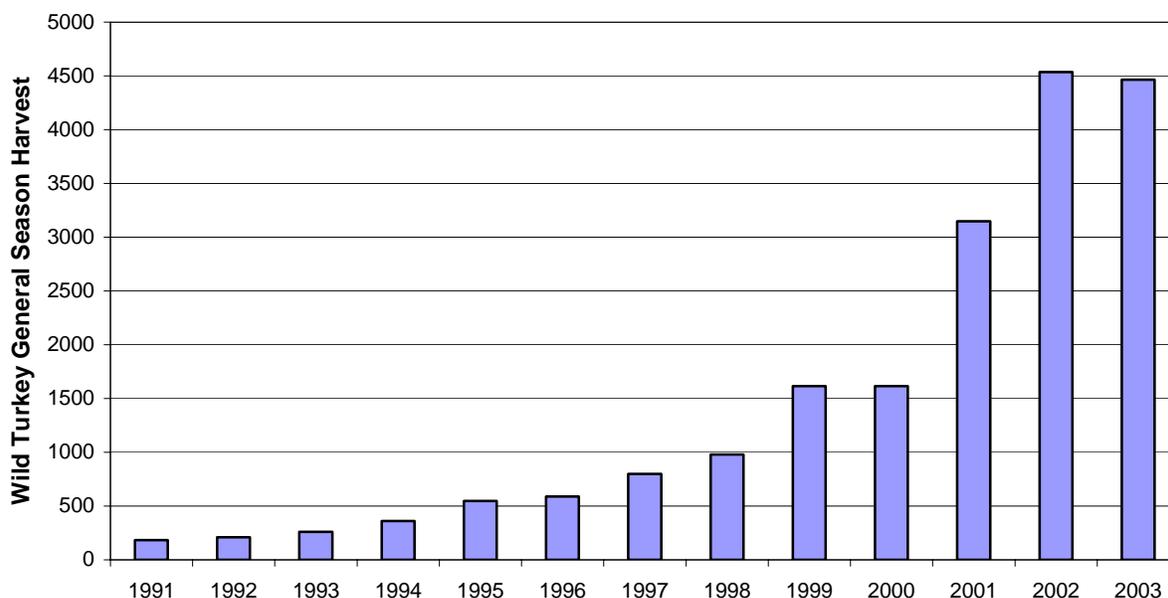
The vast majority of complaints have come from several counties in the Northeast PMU, which currently has the highest turkey density in the state. Region 1 Department staff handle 50 to 70 turkey-related complaints a year. In most cases, these complaints have centered on birds being artificially fed in some manner. To date, the department has used deterrent as well as removal methods to successfully deal with these complaints (see Appendix 1).

Current Population Status

To date, population surveys have not been conducted for any turkey subspecies in Washington. Because turkeys are so elusive and widely distributed among many different habitats, many survey techniques are unreliable, impractical or cost prohibitive (Donohoe et al. 1983, Mosby 1967). Instead, annual hunter harvest surveys have been relied on in Washington to determine population trends over time.

According to harvest trend information from 1991 to 2003, the statewide turkey population has substantially increased (Figure 4). The majority of this increase has occurred since 1996, most noticeably in eastern Washington. Stevens County (in NE Washington) presently has the highest density of turkeys. Other eastern Washington counties with substantial turkey populations are Pend Oreille, Ferry, Lincoln, Columbia, and Walla Walla. In western Washington the largest populations, although much smaller than in eastern Washington, can be found in parts of Cowlitz, Grays Harbor, Mason and Thurston counties.

Figure 4. General season wild turkey harvest 1991-2003.



There are also small, local turkey flocks in other western Washington counties. These birds are likely hybrid varieties of mostly game farm origin that were likely released by well-intentioned wild turkey enthusiasts. Because many of these birds live near populated areas or on private land, hunting opportunity is limited. It is likely that other small, scattered flocks of turkeys of similar origin exist statewide (Washington Department of Fish and Wildlife, unpublished report).

Subspecies Management

Habitats suitable for different subspecies of wild turkey exist in close proximity in many locations across the United States, and hybridization can and does occur in some populations. The Department's policy has been to manage for three subspecies in the habitats that best suit each. In some parts of the state this goal has likely been compromised, as habitats suitable to two subspecies exist.

Northeast Population Management Unit (PMU P10)

Merriam's turkeys flourished here after being established in 1961, but then slowly declined. Since a large transplant from South Dakota in 1988-89, this population has steadily expanded its range and density. Turkeys have been expanding into more urbanized Spokane County from in-state and Idaho populations for the past several years. Rio Grande turkeys were introduced (into Lincoln County) in the late 1980s and appear to be doing well there.

Southeast Population Management Unit (PMU P15)

After early attempts to establish pen-raised eastern turkeys here failed, Rio Grands were tried in the 1960s. Their population expanded significantly after a concerted Texas transplant effort from 1988 to 1990. The Blue Mountain foothills area seems to provide excellent habitat conditions and Rios continue to expand into available habitat.

North-central Population Management Unit (PMU P20)

Both Merriam's and Rio Grande turkeys were transplanted repeatedly throughout this unit in the 1980s and 1990s. Some releases were unsuccessful, while other releases have held on. The 800 Merriam's released from 2001-2003 have established flocks in several areas and data collected from radioed hens has shown low, but improving poult production. Turkeys are expanding into drainages west and south of traditional range. While Merriam's/Rio Grande hybrids undoubtedly exist in this PMU, the Department has continued to focus on Merriam's.

Due to the lack of extensive mast or berry crops, the habitat in this unit is less productive than some other areas of eastern Washington. Much of the habitat is intensively grazed, and the lack of grain farming may limit population growth.

South-central Population Management Unit (PMU P30)

All three subspecies were transplanted here at one time or another without success—94 pen-raised easterns between 1913 and 1931, 24 Merriam's in the 1960s, and 38 Rio Grande turkeys in the 1980s. Most of this unit is probably only marginal turkey habitat.

The forested zone, which is of fairly high elevation, receives significant snowfall. Deep snows in 1992-93 and 1996-97 may have hurt turkey survival, whereas recent mild winters probably benefited the birds.

This habitat is probably best suited for the Merriam's subspecies, although pockets of Rio Grande habitat occur throughout. With that in mind, 574 wild-trapped Merriam's from in state were released from 1999-2001; 30 of them were equipped with radios. Radio-tracking, observations, and harvest reports indicate that this effort was successful and birds have become widespread, especially in Kittitas County. The long-term outlook for populations in this PMU will likely be dependent on winter survival.

Klickitat Population Management Unit (PMU P35)

The Merriam's population first released here in 1965 expanded until 1970 and then appeared to be relatively stable into the 1980s. By the mid 1980s, however, harvest dropped off. In the hopes of rejuvenating this population, over 200 Merriam's were released between 1989 and 1999. This, along with improved weather conditions after the hard winter of 1996-97, seems to have reversed the downward trend. Recent reports from hunters, biologists and county harvests records indicate that this population is increasing slowly.

Northwest Population Management Unit (PMU P40)

Various releases since 1925 have failed to establish populations on the mainland or the San Juan Islands. Most releases were limited in number and widely scattered. Between 1998 and 2000, 38 turkeys were introduced into the Pilchuck Tree Farm (Snohomish County). While occasional sightings of one or two birds have been reported as far as five miles away, suggesting the birds have reproduced to some degree, populations remain very low.

Southwest Population Management Unit (PMU P50)

Releases totaling over 400 eastern wild turkeys from 1987 to 2000 have not resulted in population expansion as seen in PMU 10. A gradual increase in harvest and increasing observations of birds seen away from release sites provide indications of population expansion, however, additional investigations are needed to help determine if eastern wild turkeys have formed sustainable populations in this PMU.

Recreation Management

Hunting Seasons

Wild turkeys were classified as game birds (legally huntable) as early as 1937 by the Washington State Game Commission (State of Washington 1937). The first official hunting season, one and one-half days in length, occurred in October 1965 in Stevens County-four years after wild turkeys were first released there. Just two years later, all of eastern Washington was open to fall turkey hunting (one turkey a year). Spring hunts didn't begin until 1970, for gobblers only, and gradually increased from one to two weeks in length. By 1989, the wild turkey hunting season was three weeks long in the spring (for turkeys with visible beards only) and about one week in the fall (for either sex). The current statewide, April 15 to May 15, spring season was established in 1994.

Also in 1994, the one turkey per year bag limit was increased to three, allowing hunters to harvest one of each subspecies. In 2000, fall hunting was changed from a general season to a permit-only hunt (selected by random drawing) to ensure a conservative hen turkey harvest. The fall hunt date was also moved from late November to late September and early October to minimize overlapping other hunting seasons. In 2002, regulations changed again, allowing hunters to take two turkeys in designated portions of eastern Washington as part of their three total. A special youth hunt began in 2003 in specific game management units throughout the state.

Hunter Participation and Harvest History

The first hunting season in 1965 brought out approximately 400 hunters who harvested 120 Merriam's turkeys. Two years later, hunters were required to buy a turkey tag (\$2) and return it if they harvested a bird. That year 687 hunters bought tags and claimed 85 birds. After 1970, when hunters reached a peak of 2,600 (and bagged a record 245 birds), the turkey hunting ranks slowly thinned. The bottom came in 1987, when only 428 hunters harvested 61 turkeys.

After augmentation efforts began in the late 1980s, spring season harvest steadily increased—from 183 birds in 1991 to 1615 birds in 2000. There was a dramatic increase in spring season wild turkey harvest from 1996 to 2003, when 4,465 turkeys were harvested (Figure 4). During this time, hunter numbers have also increased—by more than 850 percent—from 1,632 hunters in 1991 to 15,783 hunters in 2003.

The Northeast Population Management Unit typically accounts for more than 80 percent of the state's annual turkey harvest. Correspondingly, the number of fall permits issued for this PMU was raised from 405 in 2000 to 2,117 in 2003. In addition, a one-week general fall season was implemented in specific areas in 2004. These additional recreational opportunities also help address turkey nuisance and damage concerns in that part of the state.

Beginning in 2001, reporting the Department began requiring hunters to report their turkey hunting activity and harvest, whether successful or not. Hunters could not buy the next year's turkey license and tag without first fulfilling this requirement. This has improved the accuracy and confidence of the annual turkey hunter and harvest figures, as well as giving the department detailed information on where hunting takes place and for how long. During this time, the statewide harvest success rate has ranged from 21 to 30 percent during the general spring hunt and 42 to 50% for the fall permit hunt.

Since 2001, more than 30,000 turkey tags have been sold every year. In 2003, hunters spent more than 68,000 days in the field hunting turkeys, averaging almost four and a half days per hunter. A survey conducted in 2002 found that 75 percent of turkey hunters were satisfied with their hunting experience.

Economic Impact

Turkey hunting is the fastest growing type of hunting in the country. A 2003 study found that spring turkey hunters in Washington spent a total of \$9.394 million in 2003. Hunters spent the most on food and beverages (\$1.485 million), transportation (\$1.361

million), trucks and other vehicles (\$983 thousand), and firearms (\$851 thousand). Turkey hunters also seem to value membership, conservation and advocacy efforts, contributing \$413 thousand in dues and contributions, and \$111 thousand for habitat improvements in 2003 (Southwick and Associates 2003).

This study found that the amount spent per spring turkey hunter averaged \$595 for Washington State. For other types of hunting in Washington, the average in-state expenditure per big game hunter was \$561, per small game hunter \$313 and per migratory bird hunter \$468 (U.S. Dept. of Interior 1996).

Washington State sales taxes, including general sales tax as well as motor fuel (gasoline) taxes, created \$459 thousand in revenue. Revenue from turkey license and tag sales in 2003 totaled \$493 thousand. Recognizing that turkey hunter dollars are often spent in rural or lightly populated areas, their economic contributions can be especially important to the rural economic base, especially when you consider turkey hunters spent over \$2 million on food, lodging, and transportation.

Public Interest

Approximately 1.8 million people watched, photographed or fed wildlife in Washington in 1996, spending \$9.6 million in the process (U.S. Dept. of the Interior, 1997). This figure accounted for 61 percent of all wildlife-related spending in the state that year. By 2001, almost 2.5 million people enjoyed watching wildlife in Washington, and spent \$9.8 million in the state doing so (U.S. Dept. of the Interior, 2003).

In 2001, a U.S. Department of the Interior survey showed nearly 2.5 million people enjoyed watching wildlife in Washington and turkeys can provide a unique wildlife viewing opportunity. During the winter, turkeys congregate in large flocks, often providing excellent viewing, photographic and video opportunities. During the spring, gobblers exhibit a magnificent breeding display and may be observed and photographed by patient individuals who learn how to call them into close range. As Washington turkey populations continue to expand, so will opportunities to view and enjoy them. This will be especially true as the Department increases its efforts to inform and educate the public about this distinctive bird.

Habitat Management

Fragmentation and Degradation

Washington has the second largest human population of the western contiguous states (more than six million in 2003), but is the smallest in size. The long-term outlook is for continued growth. As Washington's human population increases, its demand for land, water and other natural resources will continue to erode the quality and quantity of habitat for wildlife, including wild turkeys. Research efforts across the United States have shown that roads, human developments, timber harvesting, grazing, farming and fire suppression often reduce or degrade turkey habitat (Beasom and Wilson 1992, Hurst and Dickson 1992, Shaw and Mollohan 1992).

Roads

Building roads and improving existing roads can negatively or positively affect turkey populations. Road construction removes valuable roosting trees and makes others too visible and thus unusable (Beasom and Wilson 1992). When roads are frequently and heavily used, turkeys often avoid or abandon adjacent habitat (Wright and Speake 1975, Still and Baumann 1989). In addition, roads can provide easy access and promote higher levels of legal and illegal harvest (Holbrook and Vaughan 1985).

On the other hand, undeveloped roads can serve as travel corridors and feeding areas. Road rights-of-way often contain many insects, seeds, fruits and other foods. Also, if undeveloped roads are planted and/or maintained in non-woody vegetation, this can create quality brood and feeding habitat (Hurst and Dickson 1992). Land management agencies continue to realize the importance of properly planning and managing roads to balance human and wildlife needs.

Residential Development

Since 1965, the Washington's population has more than doubled to over 6 million. According to census information, nearly 2.4 million people live in unincorporated areas of Washington (80% of the 1965 statewide population) (State of Washington 2004). This movement of people into rural and formerly undeveloped lands has significantly impacted wildlife habitat. All across Washington, private and commercial developments occur within streamside and forest areas that wild turkeys and other wildlife prefer. Urbanization can totally eliminate existing turkey habitat, while suburban sprawl fragments it, leaving only disjointed, isolated areas.

Timber Harvest

Timber harvest, including pre-commercial thinning, that removes trees or reduces tree densities from large areas can negatively impact turkey populations by reducing travel corridors, escape cover and the mature trees needed for roosting sites. Kurzejeski and Lewis (1990) found that eastern turkeys seldom used fields if not bordered by mature timber stands. While the piling of post-harvest slash provides good cover for nesting hens, especially in western Washington forests, burning slash piles greatly reduces available nesting cover as well as nearby herbaceous growth. However, if done properly, logging can enhance habitat for the Merriam's subspecies (Shaw and Mollohan 1992). Changes in state natural resource policies and new ecosystem management strategies implemented since 1989 have resulted in significant reductions in timber harvest on private (26 percent) and public (69 percent) lands (Washington Department of Fish and Wildlife 2003).

Habitat Enhancement

The Upland Wildlife Restoration Program began in the 1940's and since then has enhanced upland game habitats within wild turkey range. Several habitat and hunter access agreements have been signed with private timber companies and with the Washington Department of Natural Resources. Some of these landowners have a great interest in working with the Department to enhance habitats and have huntable populations of wild turkeys on their land (Washington Department of Fish and Wildlife 1999).

In the North-central Population Management Unit, the release of Merriam's turkeys in Yakima County created so much enthusiasm from local hunters that they formed a chapter of the National Wild Turkey Federation in 1999. In addition to assisting the department with releases, radio-tracking and feeding birds during the winter, they are also exploring habitat improvements to provide more permanent winter food solutions.

SECTION 3: FUTURE DIRECTION AND GOALS

Population Monitoring

Issue Statement

Accurately determining turkey population trends is difficult throughout much of the United States. This is especially true in more forested habitats, such as those found in much of the eastern U.S, the northern tier states, and those in western Washington. Currently, the Department relies on annual hunter harvest estimates to provide population trend information. An additional survey method that is repeatable and statistically valid could improve trend monitoring in some Washington turkey populations.

Having population trend data that is independent of harvest estimates would help to more accurately monitor populations, determine appropriate hunting seasons, and identify population management needs. There are various turkey population monitoring techniques including mark-recapture studies, direct counts of wintering populations, brood surveys, mail-delivery personnel surveys, gobbling counts, hunter check stations, and landowner turkey production surveys. The applicability of these methods varies with habitat type, observability, and the overall objectives of the survey (Healy and Powell 1999).

Strategies

1. Eastern Washington:
 - a. Implement annual wintertime road transects using volunteers to identify population trends by documenting total birds seen, flock size, and flock composition.
 - i. Appendix 2 has proposed protocols for a pilot survey in northeastern Washington.
 - b. Evaluate potential use of fall brood count surveys and implement surveys where appropriate.
2. Western Washington: Due to forest density and dispersed populations effects on turkey observation, continue to use the annual harvest monitoring data from mandatory reporting by turkey hunters.
3. Continue to identify means of improving the rate and accuracy of harvest-reporting for turkey hunters statewide.

Population Management

Issue Statement

Establishing self-sustaining populations in the most suitable areas of the state has been, and continues to be, one of the primary objectives of the wild turkey management program. Various population management options have been considered, ranging from terminating population enhancement or establishment efforts to conducting experimental releases in all parts of the state.

For the term of this plan, population management activities will continue within the Wild Turkey Management Area (Map, Appendix 3). The Management Area has been divided into two designations – Currently Occupied and Potential Introduction. Not all sites within the Currently Occupied designation have resident flocks, however, turkeys are expected to naturally expand into most of these areas given enough time.

Wild turkeys do exist outside of the designated Management Area. These areas are not considered priority areas due to a combination of factors including habitat type, precipitation, elevation, human population expansion, and other management considerations (e.g., national parks). These are not the most suitable habitats and will not receive focused management efforts. The Wild Turkey Management Area map and the designated “occupied” and “potential” areas will be updated every five years with the involvement of district and regional biologists and other interested parties.

Strategies:

1. Manage for three sub-species of wild turkeys in the most appropriate habitats (Appendix 3):
 - a. Merriam’s sub-species: Pend Oreille, Stevens, Spokane, Ferry, Okanogan, Chelan, Kittitas, Yakima, and Klickitat counties
 - i. It is likely that hybridization has occurred in some of these areas, however, future management activities will focus on Merriam’s.
 - b. Rio Grande sub-species: Lincoln, Asotin, Garfield, Columbia, and Walla Walla counties;
 - c. Eastern sub-species: western Washington counties.
2. Turkeys will only be trapped in areas experiencing nuisance and damage as a means to reduce or eliminate those complaints and as part of an overall nuisance management process defined in Appendix 1. Trapped birds may be used as a population management tool as described in Strategy 3.
3. Population Augmentation and Establishment:
 - a. Currently Occupied Area:
 - i. With WDFW Regional direction, release turkeys in areas appropriate for that sub-species and in locations where there is a minimal chance of causing damage.
 - ii. Turkeys will not be released within PMU P20 and PMU P30 (Figure 3).
 - These populations are under evaluation to determine if they will be self-sustaining over time.

- b. Potential Introduction Area:
- i. Before turkeys can be released in the Potential Introduction Area, the local WDFW district team, the regional wildlife program manager and the upland game section manager must review and approve the introduction proposal. Evaluation of these proposals will begin at the district level within the Department and will, at a minimum, examine the following:
 - Current and potential nuisance and damage issues
 - Impacts to existing management actions, such as habitat restoration efforts
 - Impacts to the long-term survival of state and federally listed species (e.g., endangered and threatened) as well as candidate and sensitive species.
 - ii. Potential negative impacts will be based on credible and defensible methods, such as niche overlap analysis, habitat suitability analysis and scientific literature review. The analysis will be interpreted at a “reasonable person standard”. Measures will be identified to mitigate potential negative impacts. If impacts cannot be mitigated or no mitigation measures can be found, turkeys will not be released on that site.

Additional Direction:

- To prevent the spread of diseases that may exist among domestic and wild fowl, the Department will work with the Washington State Department of Agriculture on testing protocols for trapped wild turkeys due to be transplanted.
- All trapped wild turkeys will be aged, sexed and banded prior to release. This information will be provided to the Upland Game Section Manager, along with the number of birds released, release coordinates (Township, Range, and Section), area name and county, and the release date or dates. These records will be added to the database of Washington turkey releases.
- All release sites must provide future opportunities for general public hunting and wildlife viewing.
- If wild turkeys become established in areas outside of the Turkey Management Area (Appendix 3) and become a public nuisance or a biological concern, then the Department will take actions to address the problem.
- From 1984 through 2003, the Department, with support from the National Wild Turkey Federation, conducted an aggressive introduction program across the state. That effort has been completed.
- As recently as 2003, WDFW has augmented populations that had periodically declined through time (mainly along the eastern foothills of the Cascade Mountains (PMUs P20 and P30). There are currently no plans to augment these populations if they decline again.

4. The Department does not encourage artificial feeding of wild turkeys. While feeding may have benefits for some, it will likely concentrate turkeys in a given area. With large concentrations comes an increased likelihood of nuisance and damage complaints as well as increased chances of disease transmission.
 - a. The Department may use artificial feeding as a management tool to address nuisance and damage issues.

Research Needs

Issue Statement

Research on wild turkeys in the western United States is not common. To improve wild turkey management, the Department needs additional data on both biological and management fronts.

These include:

- Inter-specific competition
- Nutritional resources for turkeys in Washington
- Habitat utilization in western Washington
- Limiting factors analysis in western Washington

If research funding can be identified for western habitats, managers will have more precise tools to manage this species and its harvest more effectively.

Strategies

1. Conduct a literature review of wild turkey research in the western U.S..
2. Develop and/or participate in inter-specific competition research projects funded through the National Wild Turkey Federation and other public or private entities.
3. Cooperate with public and private entities to develop habitat use and limiting factors analysis for western Washington wild turkey populations.
4. Implement strategies to address research findings.

Nuisance and Damage Problems

Issue Statement

Since wild turkeys concentrate into large flocks and eat a wide variety of vegetation, they have the potential to be a nuisance, or even cause property damage. The Department receives a considerable number of nuisance and damage complaints from residents in some areas of eastern Washington where turkey numbers have expanded substantially over the past ten years. Most of the problems occur during the winter when they concentrate in flocks of 100 birds or more. Generally these problems can be effectively dealt with by removing food sources, allowing hunting, hazing, building enclosures, providing alternate food sources, or by using special kill permits issued by the Department. Through time, the most serious and habitual complaints have been handled by trapping a number of the offending birds and transplanting them to new locations. The Department is committed to provide the public with the tools to address nuisance and damage wild turkey issues.

Strategies

1. Document location of complaints on a yearly basis.
2. Evaluate Department responses to past complaints and their effectiveness.
3. Determine major factors causing complaints and work with volunteers to help landowners address problems on their property.
4. Use multiple methods to resolve complaints; including liberalized or specific hunting seasons, deterrent activities, habitat enhancements, removal by trapping, and depredation permits (see Appendix 1 for details).
5. Provide public education materials that address feeding wildlife, which can attract unwanted turkeys to their property, via print and other media outlets.
6. Explore planting alternate food sources (e.g., grain plots) to keep nuisance or damage-causing turkeys away from habitual problem areas.

Habitat Management

Issue Statement

Throughout the habitats that currently support wild turkey populations in Washington, opportunities for enhancement exist on both private and public lands. Improving habitat conditions for turkeys has additional value for some wildlife species that use the same resources.

Strategies

1. Identify and prioritize key areas for habitat improvement.
2. Use available enhancement grants to improve key habitat features used by wild turkeys (water, winter and evening roosts, winter food sources).
3. Facilitate habitat enhancement projects on private and public properties.
4. Develop habitat enhancement projects to help address issues related to winter nuisance complaints.
5. Prioritize enhancement projects on or adjacent to public or private property open to public hunting.
6. Prioritize enhancement projects that benefit species of concern and those that improve habitat for a wide variety of wildlife species.

Hunting Seasons and Hunter Access

Issue Statement

Turkey populations in some portions of Washington have increased to the point where their behavior has become problematic for local landowners and residents. One method of resolving these situations is to create, implement, and evaluate expanded hunting opportunities.

Strategies

1. Evaluate the potential impacts of fall hunting season options, including open season, increased number of permits, increased season length, and changes in season timing.
2. Provide season recommendations to the Wildlife Commission every three years with year-to-year adjustments when needed.

Issue Statement

A definitive method of determining when a hunting season change would be appropriate does not currently exist. This method needs to be statistically valid as well as flexible enough to incorporate other factors, such as changes in weather patterns, habitat, and hunter numbers.

Strategies

1. Continue to collect harvest information via mandatory hunter reporting.
2. Implement harvest-independent population monitoring. Conduct investigations to validate this population index.
3. Use harvest-independent population and harvest reporting indexes to develop a set of criteria that, when met, will trigger a change in season structure or hunting opportunity.

Issue Statement

Turkey hunters and district biologists report that turkey-hunting opportunities in some areas of eastern Washington are limited due to large acreage owned by private landowners. Private land access has also been identified as an important issue in hunter opinion surveys conducted by the Department.

Strategies

1. Increase public access to private lands through the efforts of the Department's Private Lands Program. Initial focus should be in the privately held timberlands of northeastern and southwestern Washington.
2. Investigate potential incentives (e.g., payment, liability protection, hunter access management) for public hunting access on private property. Implement those incentives that are determined to be most beneficial to the public and the landowner.
3. Partner with local chapters of the National Wild Turkey Federation in finding willing landowners who would allow public hunting.

Public Education

Issue Statement

The Department recognizes a need to improve educational outreach addressing wild turkey management in Washington. The public needs accurate, timely information that increases their knowledge and understanding of wild turkeys, their ecology and history

in Washington, as well as the Department's past management activities and future management objectives. One of the key issues that needs to be addressed is the negative effects of feeding wildlife.

Strategies

1. Create a pamphlet on wild turkey life history that includes the negative effects of feeding turkeys, how to avoid negative turkey interactions, past and future Department management activities and watchable wildlife opportunities for wild turkeys.
2. Create an informational web page that addresses common interests and concerns regarding wild turkeys.
3. Enter into cooperative educational ventures with resource-oriented groups, such as local chapters of the National Wild Turkey Federation, National Audubon Society, and city and county tourism agencies.
4. Publicize the economic benefits created by the increase in turkey related recreation, especially in rural economies.
5. Produce timely news releases that cover substantial new turkey management activities.

Enforcement Needs

Issue Statement

Illegal activities such as trespass are a common problem in some areas of the state, especially in parts of northeastern Washington, where turkey hunter numbers are rising annually. If left unaddressed, private landowner relationships may be impacted and hunter access will decline.

Strategies

1. Increase enforcement patrols in area where turkey hunters are concentrated.
2. Work with landowners to address their concerns and needs.
3. Use media outlets (including the Internet) to provide guidance for hunting on private property.

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APPENDICIES

APPENDIX 1

Wild Turkey Damage/Nuisance Control Options in Washington

Methods not requiring a permit

<i>Method</i>	<i>Description</i>	<i>Considerations</i>	<i>Restrictions / Recommendations</i>	<i>Region of use</i>	<i>Cost</i>
Fear Provoking Stimulus:					
Flagging	Mylar tape or balloons, pie plates and other types of visual stimulus set up around resource being protected.	Alternate food source is required for success during winter months. Can be effective with exclusion, diversion, or other fear-provoking stimulus. Habituation is an issue.	All fear provoking stimuli work better in combination with other control options.	Statewide	Low
Predator models	Scarecrow, Scaryman®, or other predator model	Can be effective with exclusion, diversion, or other fear-provoking stimulus. Some motion will be required to keep birds from becoming habituated to the model too quickly. Ultimately birds may become habituated anyway.	All fear provoking stimuli work better in combination with other control options.	Statewide	Med. - High
Exploders	Shell crackers, propane cannons, sirens, fire crackers, etc.	Birds can become habituated to noisemakers. It may require some experimentation to determine the best way to use cracker shells.	Some local restrictions may apply, check with local government before attempting.	Statewide	Med. - High
Distress & Alarm	A tape recording of the distress or alarm call to deter turkeys.	Use distress call in association with a predator model for most effectiveness. Birds can habituate to distress call but not as quickly as other noisemakers.	All fear provoking stimuli work better in combination with other control options.	Statewide	Med.
Dogs	Moving the family dog closer to damage area or training a guard dog.	Neighbors	All fear provoking stimuli work better in combination with other control options.	Statewide	Low -Med.
Hazing	Hazing birds with motor vehicles or other methods.		All fear provoking stimuli work better in combination with other control options.	Statewide	Low-Med.
Roost Disturbance	Repeatedly disturbing roost sites near dark to encourage turkeys to use a different area.	Best used in combination with other fear provoking stimuli or alternate control method (e.g., fencing or alternate food source)	All fear provoking stimuli work better in combination with other control options.	Statewide	Low

<i>Method</i>	<i>Description</i>	<i>Considerations</i>	<i>Restrictions / Recommendations</i>	<i>Region of use</i>	<i>Cost \$</i>
Exclusion or Food Removal:					
Remove Attractant	Have landowner remove available birdseed or other food attractant.	<u>This should be one of the first options pursued.</u> This method would be more successful if combined with other control techniques.	No restrictions. Landowner educational materials about living with wildlife should be made available.	Statewide	Low
Obstacles	Hay bales, equipment, other obstacles	Storing hay bales or equipment around food source coupled with fear provoking stimuli can be effective.	None	Statewide	Med. - High
Fencing	Snow fence, fine mesh, other fence material	Erected around resource of concern to keep turkeys out. Use with other control techniques (e.g., fear provoking stimuli) for better results.	WDFW will not purchase fences for landowners. WDFW should help facilitate fence construction when possible.	Statewide	High
Repellents:					
Chemical Application	ReJex-it Bird Aversion, Measuro, Bird Shield, etc.	Limited success on birds in general. Research on bird repellents is ongoing in the private sector	Permit may be required depending on chemical used. Check labeling before chemical application.	Statewide	Med.
Audio Repellents	Audio devices designed to deter birds from a specific area	May have limited long term success	Likely best suited in combination with other control methods	Statewide	Med
Diversion:					
Supplemental Feed Sites	Alternate food sources provided off site to attract birds away from resource being protected	<p>Diversion may initially reduce wildlife damage but effectiveness will wane over time. Consequently, diversion is least suited for problems that occur during seasons when natural food is scarce.</p> <p>If the program is discontinued, damage could be worse than before initiation.</p> <p>Use in conjunction with other control method for best results.</p>	<p>National Wild Turkey Federation program may assist with this type of project.</p> <p>WDFW will not pay for feed.</p>	Statewide (especially in eastern WA)	High

<i>Method</i>	<i>Description</i>	<i>Considerations</i>	<i>Restrictions / Recommendations</i>	<i>Region of use</i>	<i>Cost \$</i>
Habitat Manipulation:					
Change resource or the way it is managed	Change crop that is planted, time of planting and harvest, etc.	Changing what is planted to a less palatable plant or when it is planted and harvested can reduce damage. However, this may not be an alternative due to economic or seasonal restraints.	This option will have limited application, but should remain a consideration if appropriate.	Statewide	Low
Modify habitat at resource	Changing ground cover or habitat within short distance from the resource of concern.	Making the site unattractive to wildlife can help reduce damage. Removing cover from around resource will make the area unattractive to most wildlife.	This option will have limited application, but should remain a consideration if appropriate.	Statewide	Med.
Change landscape	Plant similar crops close together, change habitat away from resource to attract wildlife there (i.e., put in food plots in other areas).	Planting crops close together both spatially and temporally should reduce damage from animals using the crop at a specific time.	This option will have limited application, but should remain a consideration if appropriate.	Statewide	Med. - High
Methods requiring a permit or authorization					
Lethal/Removal Methods: Prior to removal, a determination of wild Vs domestic must be made so domestic turkeys are not translocated unknowingly					
Hunting	Encouraging hunters to remove animals during the open hunting season. Recommend fall turkey hunting opportunity in areas where turkey populations need to be decreased. Recommend an early spring hunting season in areas where wintering bird populations need to be controlled.	WDFW representatives to work closely with the landowner to develop restrictions on the sex and age of the birds or animals being removed, where the hunters can hunt, and any other restrictions they wish to place to ensure that hunting has the desired effect.	Hunters must observe state regulations and seasons. Fall turkey hunting does not ensure removal of turkeys from the offending population. Early spring seasons (depredation seasons) are not currently available. Rule revision would be required.	Areas open to hunting	Low
Out of season kill permit	A local enforcement officer can issue out of season kill permits. The landowner will be responsible for the removal of birds.	Other methods should have been attempted and failed. Issuing officer, local biologist, and landowner should consider ecological and social ramifications if a permit is issued.	The officer, in consultation with the local biologist, will establish conditions of the permit.	Statewide	Low

<i>Method</i>	<i>Description</i>	<i>Considerations</i>	<i>Restrictions / Recommendations</i>	<i>Region of use</i>	<i>Cost \$</i>
Licensed Nuisance Wildlife Control Agent	Similar to out of season kill permits. May also be an option for areas where discharging firearms is prohibited or unsafe. WDFW can authorize a Nuisance Wildlife Control Agent to remove turkeys causing damage.	Same as above.	Same as above.	Urban or non-huntable areas of the state.	High
Trap and Transfer	Problem birds are trapped and transferred to an area designated by the local biologist in conjunction with the population management plan. Approval from the Regional Program Manager and/or Upland Game Section Manager is needed.	<u>This is a tool of last resort</u> only if all else has been tried and does not work. Should be used in conjunction with diversionary method.	Tool of last resort. WDFW will conduct trapping or will coordinate with volunteers for the removal and translocation of birds.	Statewide	High

APPENDIX 2

Wild Turkey Monitoring

(A Pilot Northeast Washington (District 1) Survey)

Overall Goal: Create a harvest-independent population index for wild turkeys

Protocol:

General:

- Surveyors may be WDFW staff or volunteers.
 - District biologist will coordinate completion of survey routes.
- Surveys will be vehicle-driving routes.
 - Surveyors must adhere to established protocols and will not leave routes to access more birds (farms, yards).
- Surveyors should not exceed 35 mph during the route.
- Surveyors to stop the vehicle to count turkeys, making sure to look for other birds in the immediate vicinity or hidden in vegetative cover.
 - The drivers will make stops only when and where it is safe to do so. Safety first – count the birds second.
- Two surveyors per vehicle are needed.
- Weather must meet the following criteria:
 - Visibility not less than 1/2 mile
 - Wind speed must be less than 10 mph (leaves and twigs in constant motion).
 - Days where it is not raining or snowing are preferred.
- Surveys will be conducted between 7:00 am and 10:00 am. Surveys will begin ½ to 1 hour after sunrise. Depending on season: 7:30 to 9:00 am.
- Adequate binoculars and/or spotting scopes are required.
- Survey forms will be provided and must be completed and submitted to the coordinating district biologist.

Routes:

- Routes will be developed by the appropriate district biologist in consultation with the Upland Game Section staff.
- Identification of Routes:
 - Minimum of 15 miles, Maximum of 30 miles
 - No more than 3 hours to complete.
 - Routes will be continuous (not segmented).
 - Routes shall be located to avoid double sampling.
 - Distribute a greater number of routes in areas of high population with fewer in medium population areas and the fewest in areas of low population.
 - Maps for each survey route will be developed and provided to surveyors.
 - Routes will be developed using WDFW and volunteer input.
 - Route descriptions may be developed for each route.
 -

- Survey Route Replicates:
 - Goal: 3 replicates per route per year during the survey period (this may change in subsequent years).
 - 1st route between Feb. 21 and Feb 27.
 - 2nd route between Feb 28 and March 6
 - 3rd route between March 7 and March 13
 - NOTE: During this pilot project, surveys may be conducted during late September or late December to evaluate the most effective survey time period.
 - If replicates cannot be completed 3 times, get as many replicates as possible at dates as close to above schedule as possible.
 - Replicates must be separated by at least 3 days.
 - Routes will be driven in the same direction and manner in every case.

Data Collection / Storage:

- Data sheets will be provided.
- Data Collected:
 - Snow cover and approximate depth (data sheet will have choices)
 - Weather (including sky, wind, precipitation: possibly with choices provided on the data sheet).
 - Visibility (data sheet will have choices provided)
 - Odometer reading from starting point for each turkey group location.
 - Total group count
 - Group composition (adult males:“others”)
 - NOTE: This may not be possible, or practical, but it will be attempted during the pilot phase.
 - General habitat type at location (data sheet will have choices provided)
 - Groups will be sequentially numbered and group locations will be placed on the route map for transfer to GIS database.
- When possible, routes will be sampled by at least one of the same surveyors in successive replicate counts and successive years.
- Data to be collected from surveyors (whether WDFW staff or volunteers) by the local district biologist.
- Data to be compiled into a WDFW supported spreadsheet or database by District or Regional staff and submitted to the Upland Game Section manager within 30 days of the completed survey period.
- At a minimum, compiled data will be stored in a corporate system.
- Once interpreted, information developed from the collected data will be provided to the public through Status and Trend publications, direct communication with the surveyors, and other means as needed.

APPENDIX 3

